

Date: Wednesday, 22/10/2008 4:43:34 PM
 User: Julie Dawson

Process Sheet

Customer :	CU-DAR001 Dart Helicopters Services	Drawing Name :	212 X-TUBE ,LOW STANDARD AFT
Job Number :	42877		
Estimate Number :	13019		
P.O. Number :		Part Number :	D212664207
This Issue :	22/10/2008	S.O. No. :	
Prsht Rev. :	NC	Drawing Number :	D212-664-247 REV A
First Issue :	/ /	Project Number :	N/A
Previous Run :	36646	Drawing Revision :	A
Written By :		Material :	
Checked & Approved By :	<u>JLM 08.10.22</u>	Due Date :	07/11/2008
Comment :	Est Rev:A New Issue 07.09.12 EC verified by: JLM Est Rev:B ECN 1100p 08-01-11 DD verified by: EC Est Rev:C ECN 1121 08-02-25 DD verified by:		

Qty: 1 Um: Each

Additional Product

Job Number:



Seq. #: Machine Or Operation: Description :

1.0 DC DOCUMENT CONTROL



Comment: DOCUMENT CONTROL

Photocopy bluefile and create labels as per PPP D212-664-207 CHG001

2.0 PACKAGING 1 PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

3.0 D212664207TRN Crosstube Turning Detail



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

CROSSTUBE TURNING DETAIL

batch 15-43049

4.0 BENDING BENDING MACHINE - SKIDTUBES



Comment: BENDING MACHINE

Bend tube as per Dwg D212-664-247 using CNC bender program and Folio FT

5.0 QC6 DIMENSIONAL CHECK



Comment: DIMENSIONAL CHECK

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D212-664-207 PAR #: N/A Fault Category: Prod - X tube NCR: Yes No DQA: 11 Date: 08.11.20
Scrap / Scrap QA: N/C Closed: 10 Date: 08/11/20

NCR: <u>42877</u>		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
08-11-18	4.0	Tube was over bent during bend development. Then un-bent to achieve the 2° as per dwg. Tangent lines were not in the correct location for the new bend.	<u>MS</u> 08/11/18 <u>QSI42</u>	- Tube is scrap, but will be used for Eng / show part. - cut tube to ball park the dimensions. - Drill & install cuffs at later date.	<u>MS</u> 08-11-18 <u>QSI42</u>	<u>S</u> 08/11/20 <u>QSI42</u>	<u>MS</u> 08/11/18 <u>QSI42</u>	<u>MS</u> 08-11-18
		R.C: Bend development.						

NOTE: Date & initial all entries

Date: Wednesday, 22/10/2008 4:43:34 PM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212 X-TUBE ,LOW STANDARD AFT

Job Number: 42877

Part Number: D212664207

Job Number:



Seq. #:	Machine Or Operation:	Description :
---------	-----------------------	---------------

6.0	D36601	CUFF
-----	--------	------



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)
CUFF
Batch: _____

7.0	CROSTUBES	CROSTUBES RESOURCE 1
-----	-----------	----------------------



Comment: LANDING GEAR RESOURCE 1

1-Drill Rivet holes as per Dwg D212-664-247 using DT8972.

2-Drill pilot holes in tube as per Dwg D212-664-247

3-Ream hole to finish size in tube as per Dwg D212-664-247

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D212-664-247

4-Scribe part # and batch # using vibrating stylus as per Dwg D212-664-247

8.0	HAND FINISHING1	HAND FINISHING RESOURCE #1
-----	-----------------	----------------------------



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat Tube & Cuffs as per QSI 005 4.1

9.0	QC3	INSPECT POWDER COAT/CHEMICAL CONVERSION
-----	-----	---



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

10.0	QC5	INSPECT WORK TO CURRENT STEP
------	-----	------------------------------



Comment: INSPECT WORK TO CURRENT STEP

11.0	OUTSIDE SERV.10	OUTSIDE SERVICES -skids
------	-----------------	-------------------------



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038

Issue P/O: _____ LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 22/10/2008 4:43:34 PM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212 X-TUBE ,LOW STANDARD AFT

Job Number: 42877

Part Number: D212664207

Job Number:



Seq. #:

Machine Or Operation:

Description :

12.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage

Ensure copy of NDT results attached to work order.

13.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: Inspect for damage & ensure results are as per Dwg D412-664-203

14.0

CROSSTUBES

CROSSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Rivet Cuffs as per Dwg D212-664-247. with Sika flex in Between tube & Cuff

A/R SIKAFLEX -241/-291 BATCH: _____

15.0

CR3212406

CHERRY RIVET



Comment: Qty.: 44.0000 Each(s)/Unit Total : 44.0000 Each(s)

CHERRY RIVET

Batch: _____

16.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

17.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Wrap in plastic bag to protect from scratches

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 22/10/2008 4:43:34 PM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212 X-TUBE ,LOW STANDARD AFT

Job Number: 42877

Part Number: D212664207

Job Number:



Seq. #:	Machine Or Operation:	Description :
---------	-----------------------	---------------

18.0

D29401

Support



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)
Support
batch: _____

19.0

D3595063530

RUBBER CUSHION



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
Rubber Cushion
Batch: _____

20.0

MS2192028

Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
Clamp
Batch: _____

21.0

CROSTUBES

CROSTUBES RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1- Assemble as per Dwg D212-664-247

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3- Instal support with magnobond 6398 per dwg D212-664-247,
cure for 12hrs before packaging.

Time & date of application: _____

Batch: _____

EXP. DATE _____

22.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

23.0

AN640A

Bolt



Comment: Qty.: 4.0000 Each(s)/Unit Total : 4.0000 Each(s)
Bolt
batch: _____

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Wednesday, 22/10/2008 4:43:34 PM
User: Julie Dawson

Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 212 X-TUBE ,LOW STANDARD AFT

Job Number: 42877

Part Number: D212664207

Job Number:



Seq. #:	Machine Or Operation:	Description :
---------	-----------------------	---------------

24.0	AN641A	Bolt
------	--------	------



Comment: Qty.: 2.0000 Each(s)/Unit Total : 2.0000 Each(s)
Bolt
batch _____

25.0	MS21042L6	Nut
------	-----------	-----



Comment: Qty.: 6.0000 Each(s)/Unit Total : 6.0000 Each(s)
Nut
batch _____

26.0	AN960JD616	Washer
------	------------	--------



Comment: Qty.: 18.0000 Each(s)/Unit Total : 18.0000 Each(s)
Washer
batch _____

27.0	D34281	Placard
------	--------	---------



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)
Placard
batch _____

28.0	QC4	INSPECT 100% KITS FOR COMPLETENESS
------	-----	------------------------------------



Comment: INSPECT 100% KITS FOR COMPLETENESS

29.0	PACKAGING 1	PACKAGING RESOURCE #1
------	-------------	-----------------------



Comment: HAND FINISHING RESOURCE #1
Identify and pack for shipping as per PPP D212-664-207

30.0	QC21	FINAL INSPECTION/W/O RELEASE
------	------	------------------------------



Comment: FINAL INSPECTION/W/O RELEASE

Job Completion



MF 08-11-19

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

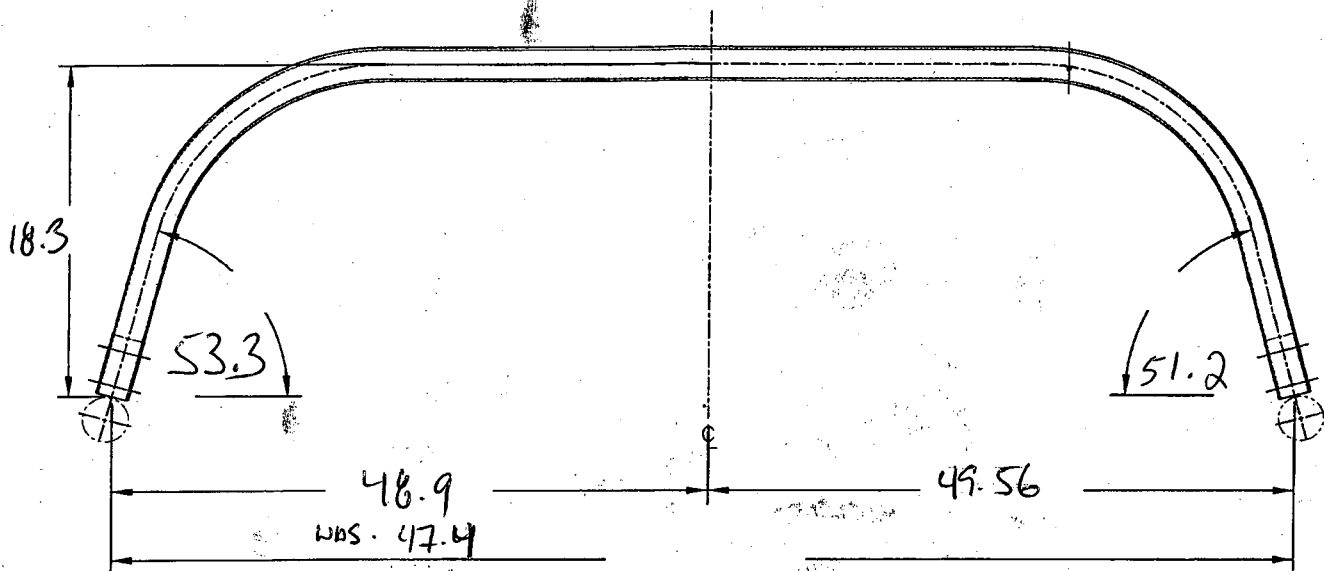
QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	42877
Description: Crosstube Low Aft (205/212)		Part Number:	D212-664-207
Inspection Dwg: D212-664-247 Rev: A		Page 1 of 1	

Required Dimension	Min	Max
Height	18.16	18.42
1/2 Span	48.55	48.81
Angle	49	52
Total Span	97.1	97.62



Comments
Tube was over bent & then unbent.
Scrap

QC15 Inspection	
Date	

Rev	Date	Change	Revised by	Approved
A	08.02.29	New Issue	KJ/JM	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

PARTS LIST:

Qty	Part Number	Description
X	D212-664-247	CROSSTUBE ASSEMBLY (205/212 LOW AFT)
1	D6008-132	CROSSTUBE
2	D2940-1	SUPPORT
4	D3595-063-530	RUBBER CUSHION
2	D3660-1	CUFF
4	MS21920-28	CLAMP (OR MS21920-30)
44	CR3212-4-06	RIVET (OR M7885/3-4-06)
A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
A/R	SIKAFLEX-241/-291	SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT)

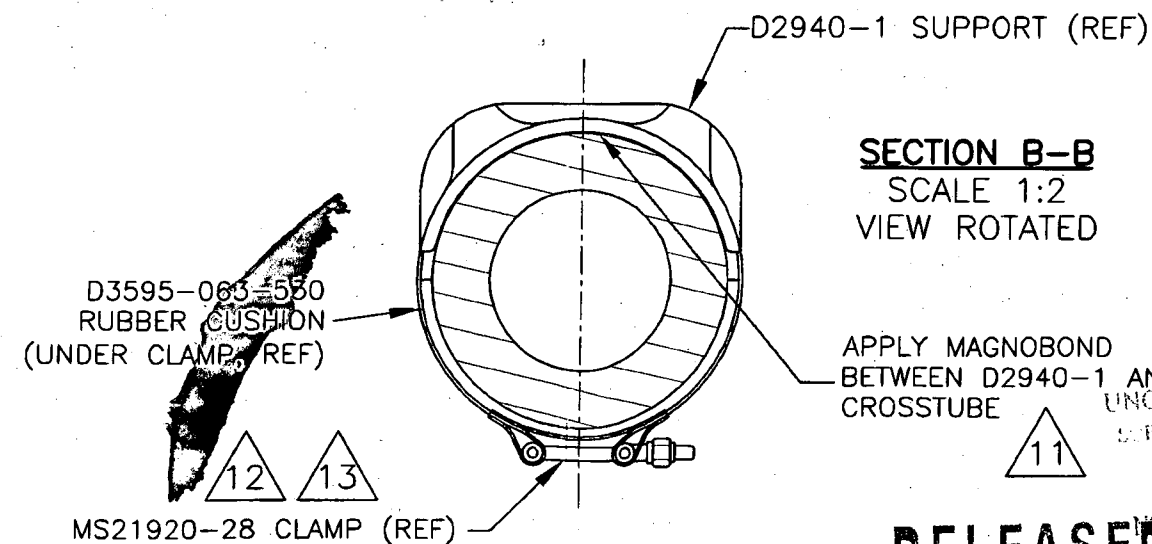
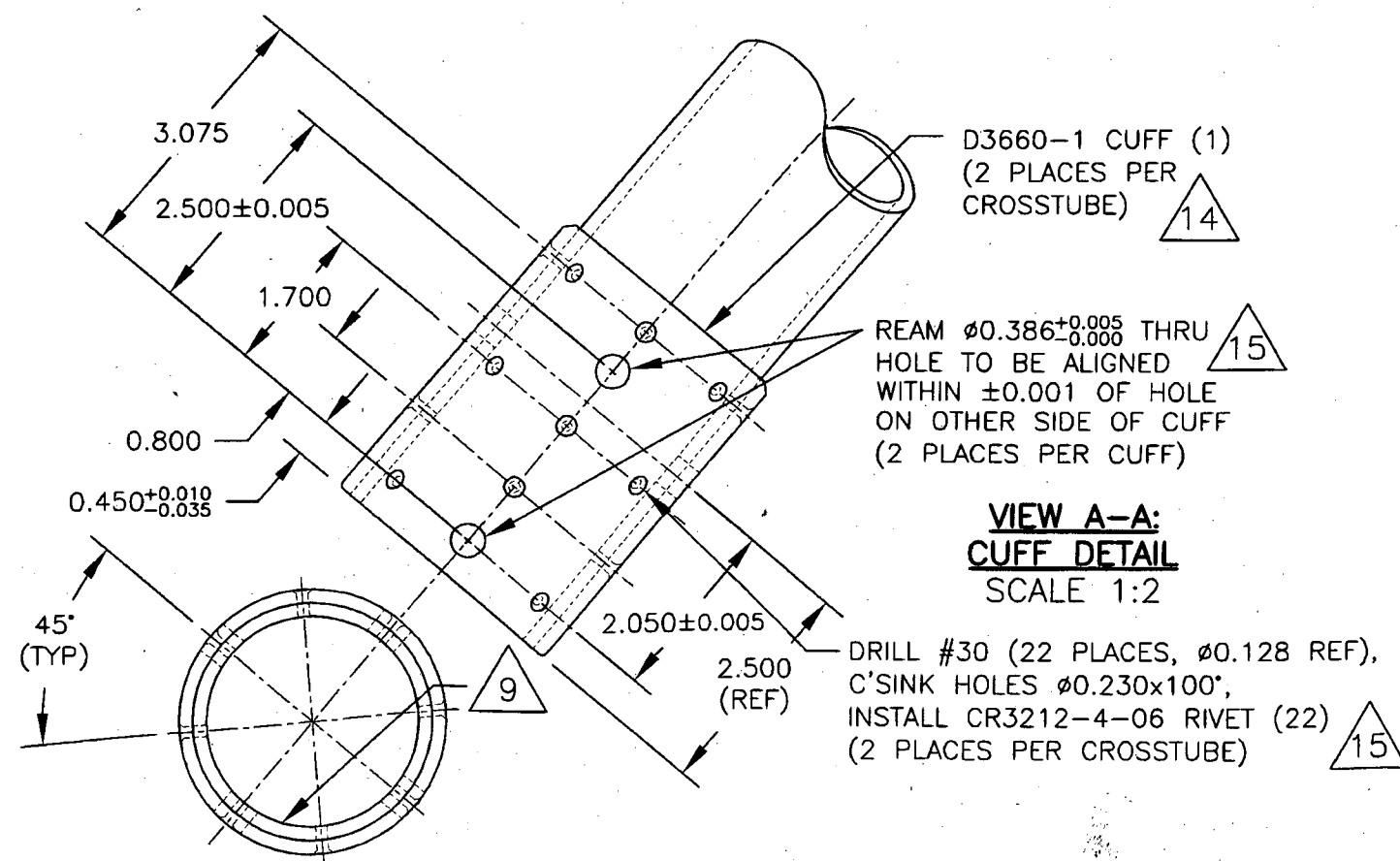
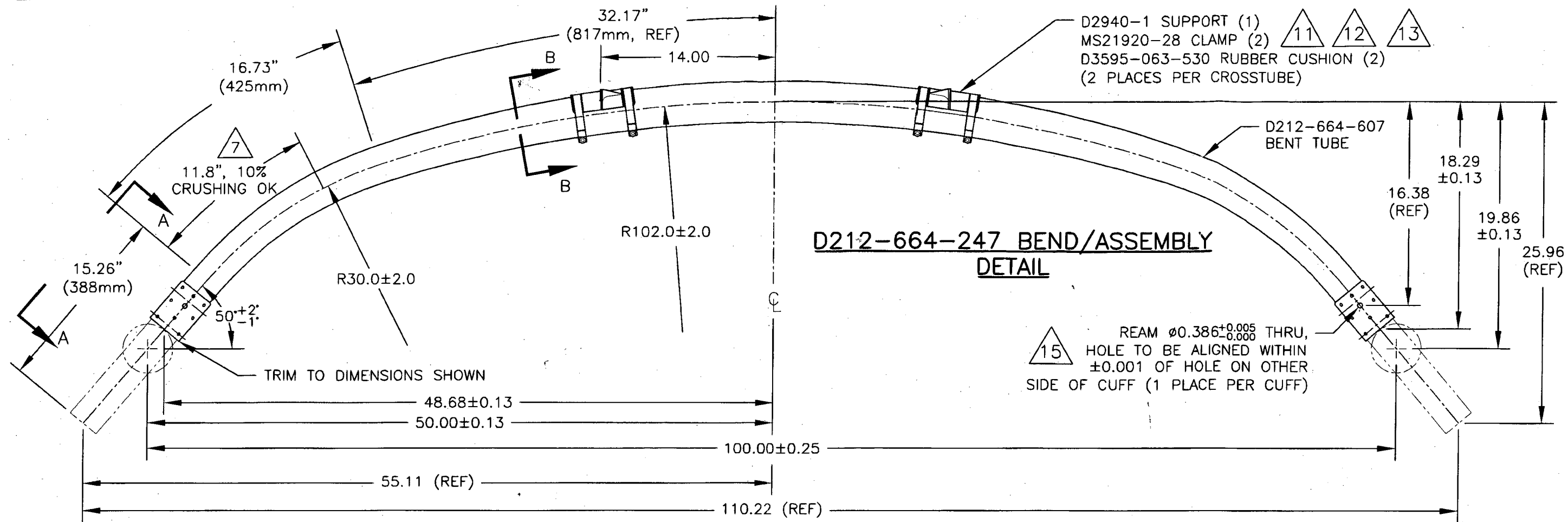
GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6008-132
FINISHED LENGTH = 128.27±0.020 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) ALL DIMENSIONS ARE IN INCHES
- 5) PART IS SYMMETRIC ABOUT CENTERLINE.
- 6) WHEN MACHINING TAPER, RUN-OFF PART AT STOCK. BLEND OUT EDGE LONGITUDINALLY,
TRANSITION SHOULD BE SMOOTH.
- 7) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE
TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 8) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 9) SCRIBE DART PART NUMBER AND BATCH NUMBER ON INNER SURFACE OF TUBE WITH A
VIBRATING STYLUS.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2940-1
THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER
INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-28 CLAMPS (OR -30) WITH D3595-063-530 RUBBER CUSHIONS TO SECURE
D2940-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE
CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY
AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 14) INSTALL D3660-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A
LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN
CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 4287

RELEASED
07.07.07

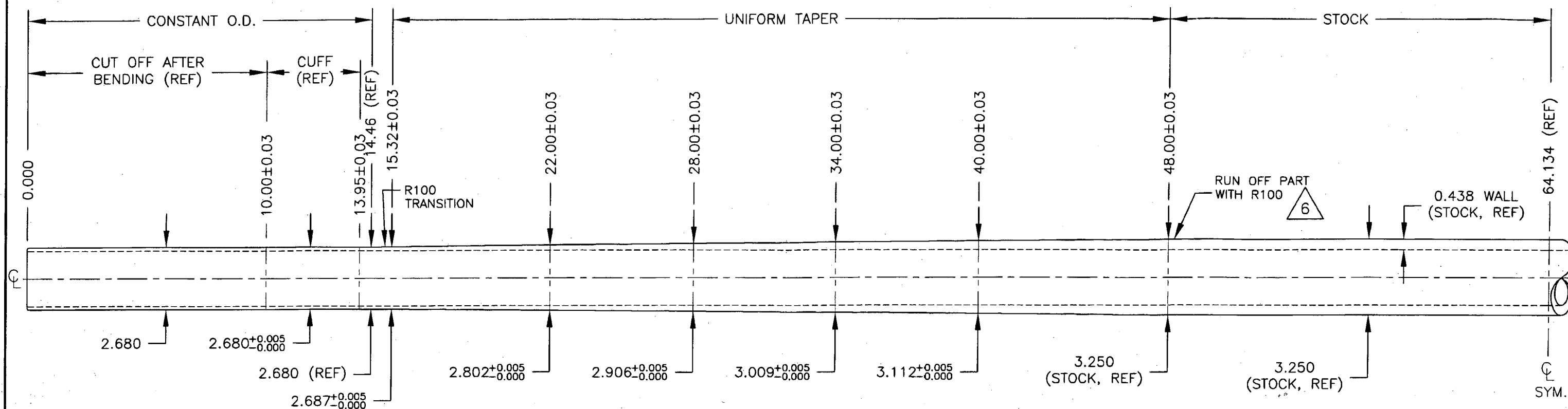
A		07.07.07	NEW ISSUE	
DESIGN		9P	DRAWN BY	9P
CHECKED		PH	APPROVED	PH
DATE		07.07.07	TITLE	
COPYRIGHT © 2007 BY DART AEROSPACE LTD.		DART AEROSPACE LTD.		REV. A
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.		DRAWING NO.		SHEET 1 OF 3
		D212-664-247		SCALE
		CROSSTUBE (205/212 LOW AFT)		NTS



SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER

RELEASED
07.09.24

COPYRIGHT © 2007 BY DART AEROSPACE LTD. THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	DESIGN <i>qp</i>	DRAWN BY <i>qp</i>	DART	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA	
	CHECKED <i>R4</i>	APPROVED <i>[Signature]</i>			DRAWING NO. D212-664-247
	DATE 07.07.07	TITLE CROSSTUBE (205/212 LOW AFT)	SCALE 1:8		



D212-664-247 MACHINING DETAIL

RELEASED
07-09-24

SHOP COPY
RETURN TO
ENGINEERING
UNCONTROLLED COPY
SUBJECT TO AMENDMENT
WITHOUT NOTICE
WORK ORDER
NO. 42877

COPYRIGHT © 2007 BY DART AEROSPACE LTD.		DESIGN	DRAWN BY	DART	DART AEROSPACE LTD. HAWKESBURY, ONTARIO, CANADA
THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.		CHECKED	APPROVED		
DATE		07.07.07		DRAWING NO.	REV. A
				D212-664-247	SHEET 3 OF 3
				TITLE	SCALE
				CROSSTUBE (205/212 LOW AFT)	1:4

